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PRELIMINARY NOTE ON THE INCIDENCE OF EPIDEMIC INFLUENZA AMONG THE ACTIVELY TUBERCULOUS.*

BY RAYMOND PEARL.

A problem of great interest in connection with the influenza pandemic of 1918 may be stated in this way: Were actively tuberculous persons more or less likely to contract influenza during the epidemic than non-tuberculous members of the general population living under essentially the same environmental conditions, and equally exposed to infection? The question may be argued *a priori* either way, and in the short period since the epidemic a good deal of what can in fairness only be called wholly unscientific and inconclusive has been written about it. It can only be answered by a sufficiently large collection of critically adequate statistics.

The purpose of this note is to present in a preliminary way certain *ad hoc* statistical material collected last spring in this laboratory, and to call the attention of other students of the influenza epidemic to the fact that we have this somewhat unique statistical material and are working it up as fast as opportunity permits. The statistics here presented are not complete. In the final report complete data will be given. The small amount of material yet to be added to the tabulations will not, however, change in any essential particular the significance of the figures here presented.

The data were collected by the Visiting Tuberculosis Nurses of the Baltimore Health Department, working on this problem under the direction and supervision of Miss Blanche F. Pooler, supervisor of field workers in the writer's laboratory. Each household containing an active case of tuberculosis registered with the Health Department was visited by a nurse and a card form filled out by her, after personal determination of the facts about the family. Besides the data included in the present

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TABLE I.

SHOWING THE INCIDENCE OF INFLUENZA AMONG TUBERCULOUS AND NON-TUBERCULOUS WHITE INDIVIDUALS, ARRANGED (A) BY NUMBER OF PERSONS IN HOUSEHOLD, AND (B) BY PRESENCE OR ABSENCE OF OTHER CASES OF INFLUENZA.

Number in household	Tuberculous				Not Tuberculous			
	Influenza		No Influenza		Influenza		No Influenza	
	Other cases in household	No other cases in household	Other cases in household	No other cases in household	Other cases in household	No other cases in household	Other cases in household	No other cases in household
1	..	..	..	14	..	..	..	..
2	4	10	12	108	4	15	7	100
3	46	39	38	161	76	22	118	292
4	72	28	81	255	168	37	243	696
5	89	27	78	221	262	21	363	749
6	73	16	96	210	303	29	419	822
7	71	9	83	123	358	18	480	636
8	51	2	68	82	257	24	414	446
9	22	3	40	33	117	8	188	246
10	18	1	16	20	114	3	138	170
11	8	..	12	12	49	5	91	43
12	3	..	5	5	36	1	63	43
13	2	..	3	2	32	..	28	24
14	..	..	..	..	..	..	..	..
15	1	..	1	1	12	..	16	14
Totals	460	135	533	1,247	1,788	183	2,568	4,281
	595		1,780		1,971		6,849	
	2,375				8,820			

tabulations information was got on a number of other points which will be presented in the definitive report. Each card brought in by a nurse was critically scrutinized by Miss Pooler, and if any information was lacking, or if the facts recorded were in any respect unusual, the nurse was sent back on a second or even third visit, until finally the data accepted as of final record were as nearly accurate as it was humanly possible to make them.

Tables I to III inclusive comprise the preliminary tabulations which it is desired to present here. Only the figures for whites are given in this note. The numbers in the tables for negroes were too small to warrant taking space for in a brief preliminary communication. The negro data show no essential differences from the whites in respect to the main points here under discussion. The tables are arranged on the principle of dichotomy to get a maximum of information in a minimum of space. A description of the second line of Table I will indicate

TABLE II.

SHOWING THE INCIDENCE OF INFLUENZA AMONG WHITE TUBERCULOUS PERSONS ACCORDING TO (A) DURATION OF THE TUBERCULAR PROCESS, AND (B) PRESENCE OR ABSENCE OF OTHER CASES OF INFLUENZA IN THE HOUSEHOLD.

Years patient had been tuberculous	Patient Had Influenza			Patient Did Not Have Influenza		
	Other cases in household	No other cases in household	Total	Other cases in household	No other cases in household	Total
Under 1 year	108	65	173	57	133	190
1 year	44	17	61	68	172	240
2 years	65	15	80	75	176	251
3 "	63	20	83	64	139	203
4 "	50	15	65	65	128	193
5 "	56	11	67	46	135	181
6 "	39	14	53	49	109	158
7 "	40	10	50	36	76	112
8 "	40	11	51	37	74	111
9 "	35	10	45	45	110	155
10 "	13	4	17	11	31	42
11 "	1	2	3	7	17	24
12 "	6	..	6	8	16	24
13 "	1	..	1	2	2	4
14 "	2	..	2	..	3	3
15 "	..	..	..	3	7	10
16 "	1	..	1	3	..	3
17 "	...	..	..	..	1	1
18 "	1	..	1	..	..	..
20 "	..	..	..	2	..	2
23 "	..	..	..	..	1	1
25 "	..	..	..	..	1	1
32 "	..	..	..	..	1	1
34 "	1	..	1	..	..	..
Total	566	194	760	578	1,332	1,910

how this table is to be read. In households of two persons each there were 14 tuberculous persons who had influenza and 120 tuberculous persons who did not have influenza. Of the 14 tuberculous persons who had influenza 4 were in households where other cases of influenza occurred, and 10 were in households where no other cases of influenza except their own occurred. Again, in households of two persons, there were 19 non-tuberculous persons who had influenza and 107 who did not. Four of the influenza cases occurred in households where there were no others and 15 of the cases were in households where there were other cases, etc.

From Table I we note that of the 2,375 tuberculous persons, 595, or 25 per cent., had influenza, while 1,780, or 75 per cent., did not have this disease during the epidemic. Of the 8,820 non-tuberculous individuals living in the same households as the tuberculous, 1,971, or 22.3 per cent., had influenza,

TABLE III.

SHOWING THE INCIDENCE OF INFLUENZA AMONG TUBERCULOUS AND NON-TUBERCULOUS WHITES ACCORDING TO THE NUMBER OF CASES OF INFLUENZA IN THE HOUSEHOLD.

Number of cases of influenza in household	Number of households	Total number of persons in household	Total cases of influenza	Persons Tuberculous			Persons not Tuberculous		
				Had influenza	Did not have influenza	Total	Had influenza	Did not have influenza	Total
0	1,104	5,492	0	0	1,234	1,234	0	4,258	4,258
1	324	1,644	324	137	236	373	187	1,084	1,271
2	228	1,231	456	132	141	273	324	634	958
3	152	844	456	113	71	184	343	317	660
4	88	546	352	65	35	100	287	159	446
5	73	536	365	68	27	95	297	144	441
6	46	358	276	40	13	53	236	69	305
7	26	218	182	33	5	38	149	31	180
8	14	131	112	14	3	17	98	16	114
9	4	42	36	3	2	5	33	4	37
10	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..
13	1	13	13	1	..	1	12	..	12
Total	2,060	11,055	2,572	606	1,767	2,373	1,966	6,716	8,682

and 6,849, or 77.7 per cent., did not have it. It, therefore, appears that, under the same environmental conditions of living, only 2.7 per cent. more of the tuberculous individuals than of the non-tuberculous contracted influenza during the epidemic. This difference is small and probably not statistically significant. There are many other interesting points brought out by the data of Table I, discussion of which will be reserved for the complete paper.

Table II concerns the tuberculous *only.* It arranges the data to show the relative liability of a tuberculous person to contract epidemic influenza, in relation to the length of time he (or she) had been tuberculous.

This table shows among other things that the longer had been the duration of the tubercular process the smaller in general was the probability that the patient would have influenza during the epidemic, though in duration of 1 to 9 years inclusive the proportionate incadence of influenza changed but slightly.

From Table III we note:

1. That a little more than one-half (1,104) of the total num-

ber of *households* (2,060) comprised in the statistics had no case of influenza in them during the epidemic.

2. That only about one-fourth (2,572) of the total *persons* (11,055) included in the statistics had influenza.

3. That in households where only one case of influenza occurred, 37 per cent. of the tuberculous persons living in such households had influenza, while but 15 per cent. of the non-tuberculous living in such households had influenza.

4. That in households where two cases of influenza occurred, 48 per cent. of the tuberculous persons, and 34 per cent. of the non-tuberculous living in such households had influenza.

5. That in households where three or more cases of influenza occurred, 68 per cent. of the tuberculous persons and 66 per cent. of the non-tuberculous living in such households contracted influenza.

Discussion of the meaning of the above data, presented here simply as facts, will be undertaken in the later complete report.